

Research Article

Differences Among Patients That Make Their Tinnitus Worse or Better

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Purpose: Our objective was to identify activities that influence tinnitus and to determine if conditional probabilities exist among such variables.

Method: Two hundred fifty-eight patients were asked the following two questions: "When you have your tinnitus, which of the following makes it worse?" and "Which of the following reduces your tinnitus?"

Results: Things that made tinnitus better included noise (31%) and relaxation (15%). Things that made tinnitus worse

included being in a quiet place (48%), stress (36%), being in a noisy place (32%), and lack of sleep (27%). Almost 6% of patients suggested coffee/tea and 4% said certain foods made their tinnitus worse. Conditional probabilities indicated that for those whose tinnitus is not worse in quiet, it is usually not reduced by noise. For those whose tinnitus is not worse in noise, it is usually not reduced in quiet.

Conclusion: There are dramatic differences among patients. Such differences need to be considered in planning treatments.

Tinnitus patients often report that some experiences in daily life make their tinnitus worse, but other experiences can actually make their tinnitus better.

These reported activities vary widely across patients. These differences are important because they should be considered in those counseling and sound therapy applications that consider individual needs (e.g., Mohr & Hedelund, 2006; Tyler, Stouffer, & Schum, 1989; Tyler et al., 2006). These differences also reflect different subgroups of patients with tinnitus. For example, patients whose tinnitus is made worse by noise might have a different tinnitus mechanism than other patients with tinnitus.

Tyler and Baker (1983) identified some differences simply by asking patients to list the difficulties they experienced (see also Sanchez & Stephens, 2000). Stouffer and Tyler (1990) explored this more systematically by providing a fixed set of response options on the basis of the earlier work. They sampled 528 patients with tinnitus from four different clinics. A few noteworthy observations were that many patients (28%) reported that their tinnitus was worse in noise, whereas others (19%) reported that their tinnitus was better in noise. In addition, about 25% of the patients in this group indicated that their tinnitus severity had worsened over time, and 20% reported that nothing made

their tinnitus worse. They also observed that 18% reported near normal hearing and 25% believed their tinnitus interfered with their hearing of speech. Thirty-five percent of the patients whose primary complaint was tinnitus stated that their tinnitus made them feel depressed, but if their primary complaint was hearing loss, only 24% said their tinnitus made them feel depressed. Numerous researchers have now documented the wide range of factors that affect patients with tinnitus. These factors include the following: (a) hearing (Stevens, Walker, Boyer, & Gallagher, 2007; Stouffer & Tyler, 1990; Tyler & Baker, 1983); (b) anxiety and depression (Budd & Pugh, 1995; Erlandsson, 2000; Erlandsson & Holgers, 2001; Folmer, Griest, Meikle, & Martin, 1999; Halford & Anderson, 1991; Holgers, Barrenäs, Svedlund, & Zöger, 2003; Kaluzny, Durko, & Pajor, 2004; Kuk, Tyler, Russell, & Jordan, 1990; Meikle & Griest, 1989; Stevens et al., 2007; Stouffer & Tyler, 1990; Tyler & Baker, 1983); (c) sleep (Folmer & Griest, 2000; Folmer, Griest, & Martin, 2001; Hébert & Carrier, 2007; McKenna & Daniel, 2006); (d) cognition (Andersson, Eriksson, Lundh, & Lyttkens, 2000; Hallam, McKenna, & Shurlock, 2004; Hallam, Rachman, & Hinchcliffe, 1984; Newman, Wharton, & Jacobson, 1997); (e) memory (Andersson, Ingerholt, & Jansson, 2003; Hallam et al., 2004; Rossiter, Stevens, & Walker, 2006); (f) attention (Andersson et al., 2000; Andersson, Khakpoor, & Lyttkens, 2002; Andersson et al., 2003; Hallam et al., 2004; Rossiter et al., 2006; Stevens et al., 2007); and (g) mental activity (Andersson, Lyttkens, & Larsen, 1999; Andersson et al., 2002; Tyler & Baker, 1983; Wilson, Henry, Bowen, & Haralambous, 1991). We

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believe that understanding differences in daily experiences of patients with tinnitus could be important in identifying subgroups and planning treatments. For example, the Tinnitus Primary Function Questionnaire (Tyler et al., 2014) utilizes primary effects to focus treatment and enhance sensitivity in clinical trials. Because understanding these problems are important, we felt it was worthwhile to replicate a portion of the Stouffer and Tyler (1990) study. The present study differs from the earlier one in that the current study was performed over 20 years later. Many counseling and sound therapies are now available (see Tyler, 2006a, for a review), and much information and misinformation are available on the Internet.

The sample for the 1990 study was taken from patients who were seen in routine clinics. In the present study, the sample was drawn from patients who had actually enlisted in clinical trials. In the current study, we expanded the response options to explore in more detail the experiences that patients reported changing tinnitus. The current report also contains new statistical analysis of exploratory conditional probabilities.

Method

Data were gathered from 258 patients with tinnitus who participated in clinical trials from December 2000 to July 2007 at the University of Iowa. Patients were aged from 26 years to 86 years ($x = 54.9$; $SD = 10.39$), and there were 163 men and 95 women. Their tinnitus duration ranged from 0.2 years to 65.5 years ($x = 9.7$; $SD = 13.02$). Eighty-five percent (219) reported their tinnitus was present at least 80% of the time. Patients were administered two questions: “When you have your tinnitus, which of the following makes it worse?” and “Which of the following reduces your tinnitus?” They were provided a list of response options (see Table 1, Table 2, and Table 3). Patients completed the questionnaires independently without input from clinicians or researchers. They were left to interpret the wording of questions as stated (for example, the level of the background noise was not stated). In order to examine common factors between variables, we explored conditional probability. A *conditional probability* is the probability that one event will occur given that another event has already occurred. We did both joint probability and conditional probability at first. However, we believed that the magnitude of the joint probabilities was too small for us to evaluate properly. In order to better differentiate the underlying relationship, we chose conditional probabilities to look at the relatedness between factors. In addition to conditional probability, we also used chi-square tests for independence to further determine whether the relationship is significant.

Results

What Makes Tinnitus Worse?

Table 1 lists the patients’ answers to the question “When you have your tinnitus, which of the following makes

it worse?” The answers are listed in order of the descending frequency of occurrence of positive answers. Almost one half of the patients reported that being in a quiet place made their tinnitus worse. More than one third of the patients reported that their tinnitus was made worse by “emotional or mental stress,” “having just recently been in a noisy situation,” “being in a noisy place,” and “lack of sleep.” The other category included comments such as “weather,” “accentuated body movements,” “altitude changes,” and “driving a car.” Another notable response was “having recently worn hearing protection,” and “worse after a nap.” Table 1 also compares the findings of the current study to those of Stouffer and Tyler (1990). One can compare changes in the two studies in at least two ways: an absolute difference ($x-y$) or a percent difference ($[x-y]/100\%$). In general, the results are similar. In might be noteworthy that in the present study about 48% of patients said being in a quiet place (up from 36%), and about 36% said that emotional or mental stress made their tinnitus worse (up from 29%). Only 5% of the patients in the current study answered that changing their head position makes their tinnitus worse, which was reported by 16% in the 1990 study. Temporomandibular joint disorder or other facial muscle or jaw problems have been linked to tinnitus (e.g., Cacace, 2003; Sanchez, da Silva Lima, Brandão, Lorenzi, & Bento, 2007; Vernon, Griest, & Press, 1992).

Almost 6% of subjects in the current study suggested coffee or tea made their tinnitus worse, and 4% said food made their tinnitus worse (these options were not provided in 1990).

What Reduces the Tinnitus?

Table 2 lists answers to the question “When you have your tinnitus, which of the following reduces your tinnitus?” The questions are listed in order of the descending frequency of occurrence of positive answers. The most common responses were “being in a noisy place” (23%) and “relaxation” (15%). “First waking up in the morning” (9%) and “being in a quiet place” (7%) were also reported often. It is noteworthy that 5% believed medications reduced their tinnitus, and 4% indicated that changing their head position reduced their tinnitus.

Comparing the results to those of Stouffer and Tyler (1990), two of the outcomes were similar: “being in a noisy place” (26% to 19%, respectively) and “being in a quiet place” (7% to 10%). More patients in the 1990 study said that nothing makes it better (41% in 1990 to 31% in the present study). Another difference was the number of patients who reported their tinnitus is reduced when they were just recently in a noisy situation, which was reported by 1.2% in the current study and 5% in the 1990 study. The other category included comments such as “keeping busy,” “humidity,” and “concentrating on a task.”

Conditional Probabilities Between Factors That Make Tinnitus Worse or Reduce It

We explored the relation among the positive and negative impacts on tinnitus by examining the conditional

Table 1. Patients' answers to the question "When you have your tinnitus, which of the following makes it worse?" The results from the present study are compared with the previous work of Stouffer and Tyler (1990) in the two right-most columns.

What makes tinnitus worse?	Present study, %	Stouffer and Tyler (1990), %	Difference (x-y)	% Difference (x-y)/y*100
Being in a quiet place	47.7	36	11.7	33
Emotional or mental stress	36.4	29	7.4	26
Having just recently been in a noisy situation	36	31	5	16
Being in a noisy place	32.2	28	4.2	15
Lack of sleep	27.1	23	4.1	18
Other	19			
When tired from doing physical work	16.3	17	-0.7	-4
When first waking up in the morning	14.3	12	2.3	19
Shooting guns, rifles	12.4	13	-0.6	-5
Not sure what	10.5	20	-9.5	-48
When excited	8.5	12	-3.5	-29
Relaxation	7.8	10	-2.2	-22
Sudden physical activity	7.4	10	-2.6	-26
Alcohol	6.6	7	-0.4	-6
Drugs/medicine	6.2	7	-0.8	-11
Nothing	6.2			
Coffee/tea	5.8			
Changing head position	5	16	-11	-69
Food	4.3			
Constipation	1.6			
During a menstrual period	1.6			
Smoking	0.4			

probability. For example, could it be that patients who are very distressed about their tinnitus also have a tinnitus that is made worse in noise? To study this, we first identified factors that might influence tinnitus and factors that we had sufficient responses to so that the analysis would have appropriate power. Second, we calculated conditional probabilities for those factors. When we evaluated the bivariate

statistics, we checked whether the chi-square test is valid with the rule of at least 80% of the expected frequencies exceed 5 and all the expected frequencies exceed 1.

Table 3 shows the relationship between those who report tinnitus is better in noise and then also reported that their tinnitus is worse in quiet. We evaluated seven chi-square comparisons we thought were of interest. The chi-square

Table 2. Patients' answers to the question "When you have your tinnitus, which of the following reduces your tinnitus?" The results from the present study are compared with the previous work of Stouffer and Tyler (1990) in the two right-most columns.

What reduces patients' tinnitus?	Present study, %	Stouffer and Tyler (1990), %	Difference (x-y)	% Difference (x-y)/y*100
Nothing makes it better	30.6	41	-10.4	-25
Being in a noisy place	22.5	19	3.5	18
Other	21.7			
Relaxation	14.7			
Not sure	14.7			
When first waking up in the morning	8.9			
Being in a quiet place	7.4	10	-2.6	-26
Drugs/medicine	5			
Changing head position	3.9			
Sudden physical activity	2.7			
Alcohol	2.3			
Having just recently been in a noisy situation	1.2	5	-3.8	-76
When tired from doing physical work	0.8			
When excited	0.8			
Food	0.8			
Coffee/tea	0.4			
Lack of sleep	0.4			
Constipation	0			
During a menstrual period	0			
Shooting guns, rifles	0			
Smoking	0			
Emotional or mental stress	0			

Table 3. Chi-square table for the conditional probability between patients' answers to questions regarding their tinnitus being reduced in noise and then also worse in quiet. Data are presented as *n* (%).

$\chi^2 (1, N = 258) = 71.7, p < .001$		Is your tinnitus reduced when you are in a noisy place?		
Is your tinnitus worse when you are in a quiet place?		No	Yes	Total
	No	133 (98.5)	2 (1.5)	135 (100)
	Yes	67 (54.5)	56 (45.5)	123 (100)
	Total	200 (77.5)	58 (22.5)	258 (100)

was significant, $\chi^2(1, N = 258) = 71.7, p < .001$. Of those who report that their tinnitus is "not worse in quiet," 98.5% (133/135) reported their tinnitus is "not reduced in noise," whereas 1.5% (2/135) reported that their tinnitus is better in a noise.

Table 4 shows the probability that those who report tinnitus are worse in noise and those who report tinnitus are better in quiet. The chi-square was significant, $\chi^2(1, N = 258) = 30.9, p < .001$, suggesting a real conditional probability does exist. Examining the table, there are two big effects. Of those who report that their tinnitus is "not worse in noise," 98.9% (173/175) reported their tinnitus is "not reduced in quiet," whereas 1.1% (2/175) reported that their tinnitus is "better in quiet."

Table 4 also shows that, of those patients who report that their tinnitus is "worse in noise," 79.5% (66/83) also reported their tinnitus is "not reduced in quiet" and 20.5% (17/83) reported that their tinnitus is "reduced in quiet."

Table 5 shows that those who report tinnitus are "worse with lack of sleep" are likely to report tinnitus is "worse with stress." The chi-square was significant, $\chi^2(1, N = 258) = 39.1, p < .001$, suggesting a real conditional probability does exist. Of those who report that their tinnitus is "not worse with lack of sleep," 75.0% (141/188) reported their tinnitus is "not worse under stress," whereas 25.0% (47/188) reported that their tinnitus was "worse under stress."

Table 5 also shows that, of those who report that their tinnitus is "worse with lack of sleep," 67% (47/70) reported their tinnitus was "worse under stress," whereas 32.9% (23/70) reported that their tinnitus was "not worse under stress."

Table 6 shows that those who report that their tinnitus is "worse in noise" also are likely to report that their tinnitus is "worse with stress." The chi-square was significant, $\chi^2(1, N = 258) = 16.7, p < .001$, suggesting a real conditional probability does exist. Of those who report that their tinnitus is "worse in noise," 72.0% (126/175) reported their tinnitus is "not worse under stress," whereas 28.0% (49/175) reported that their tinnitus was "worse under stress."

For other factors that might affect tinnitus, chi-square tests and conditional probabilities showed no significant difference between each of the pairs.

- There was no increased probability between reports that being in a quiet place made their tinnitus worse and reports that stress that made tinnitus worse.
- There was no increased probability between reports that being in a quiet place made their tinnitus worse and reports that lack of sleep made tinnitus worse.
- There was no increased probability between reports that being in noise made tinnitus worse and reports that lack of sleep made tinnitus worse.

It is of interest to note that some patients (*n* = 25 out of 258) answered that their tinnitus was worse in quiet and in noisy environments. This represents a small number of our sample, but should be investigated more thoroughly in future studies.

Next we attempted to determine if we could distinguish those patients who report tinnitus was worse or better in noise and worse or better in quiet. In Table 7, we compare the age, average pure tone hearing loss for left and right ears, and duration of tinnitus for those who report tinnitus was worse in quiet or noise. No significant differences were found. In Table 8, we could find no differences on these variables for patients who reported tinnitus was better in noise or in quiet, with one exception. Patients who reported their tinnitus was "better in quiet" had a shorter duration of tinnitus (2.9 compared with 11.5 years), but this should be taken cautiously because it is based on only 13 patients.

Discussion

In this article, we have identified factors that patients report make their tinnitus worse or better. First we review these findings and then discuss implications for treatment. We comment on their relevance to identifying tinnitus subgroups.

Table 4. Chi-square table for the conditional probability between patients' answers to questions regarding their tinnitus being better in quiet and then worse in noise. Data are presented as *n* (%).

$\chi^2 (1, N = 258) = 30.9, p < .001$		Is your tinnitus reduced when you are in a quiet place?		
Is your tinnitus worse when you are in a noisy place?		No	Yes	Total
	No	173 (98.9)	2 (1.1)	175 (100)
	Yes	66 (79.5)	17 (20.5)	83 (100)
	Total	239 (92.6)	19 (7.4)	258 (100)

Table 5. Chi-square table for the conditional probability between patients' answers to the questions regarding whether their tinnitus is worse with lack of sleep and then worse under stress. Data are presented as *n* (%).

		Is your tinnitus worse with emotional or mental stress?		
		No	Yes	Total
Is your tinnitus worse with lack of sleep?	No	141 (75.0)	47 (25.0)	188 (100)
	Yes	23 (32.9)	47 (67.1)	70 (100)
	Total	164 (63.6)	94 (36.4)	258 (100)

What Patients Report Their Makes Tinnitus Worse or Better in Their Daily Life

Patients report that many things make their tinnitus worse, and this varies widely across patients. Tinnitus is often made worse by the following: being in a quiet place, stress, noise, and lack of sleep. Many things can make tinnitus better, and this also varies widely across patients. These include being in background noise and relaxing. We cannot judge from the questionnaire responses whether the patients' tinnitus itself was influenced by these factors or whether their reactions were changed (see the Psychological Model of Tinnitus proposed by Dauman & Tyler, 1992; Tyler, Aran, & Dauman, 1992).

It is possible that it is a combination of both influences. We also cannot determine the patients' interpretation of noise or quiet. For example, for some tinnitus might be made worse in low levels of noise, but for others only high levels of noise might make the tinnitus worse.

Noteworthy is that about one third of the patients reported that nothing made their tinnitus better. Our results are generally consistent with those reported by Stouffer and Tyler (1990) and of others (see Introduction). Patients whose tinnitus is worse in quiet or in noise represent different subgroups.

Although some observations are less common, they might indeed be important. Some patients report that their tinnitus is made worse by food, coffee/tea, and alcohol. These observations might be insightful, because it suggests that modification of the diet might make tinnitus better in some patients. It might be that diet could be effective for more patients, but they are not aware of this. We note also that Stephens (1999) found that 84% of 51 patients reported that their tinnitus was aggravated by drinking alcohol.

When first waking up in the morning, some patients believe their tinnitus is better (about 9%), whereas other patients believe their tinnitus is worse (about 14%). A better

tinnitus might be related to relaxation. A worse tinnitus might be related to waking in a quiet room. It should also not be overlooked that the brain goes through several cycles during sleep, and this surely involves brain circuits involved in tinnitus.

Relationship Among Variables

We also attempted to determine conditional probabilities among variables. For patients who report their tinnitus is not worse in quiet, it is almost always also not made better by noise. These patients are not likely to benefit from background noise and do not need to avoid quiet situations. These patients likely do not monitor the background sound levels in their environment. In another group of patients whose tinnitus is worse in noise, their tinnitus is also "not better in quiet." These patients are at a particular disadvantage because noise makes their tinnitus worse, but seeking out quiet does not provide relief. These patients need to monitor background sound and avoid levels of noise that make their tinnitus worse. A group of resilient patients are those who report their tinnitus is not worse with lack of sleep. They also typically report that they do not experience their tinnitus becomes worse under stress. We identified that patients who report their tinnitus is worse in noise also find that their tinnitus is not worse under stress.

The absence of relations can also be important. We found the following: (a) for patients who reported their tinnitus was worse in a noisy place, there was no indication that emotional or mental stress made their tinnitus worse; (b) for patients who reported their tinnitus was worse in a quiet place, there was no indication that emotional and mental stress was making their tinnitus worse.

The patients who report different effects of quiet and of noise are of particular interest. Although one would assume they clearly represent different subgroups, we were not able to identify distinguishing characteristics on the

Table 6. Chi-square table for the conditional probability between patients' answers to the questions regarding whether their tinnitus is worse in noise and then worse under stress. Data are presented as *n* (%).

		Is your tinnitus worse with emotional or mental stress?		
		No	Yes	Total
Is your tinnitus worse with being in a noisy place?	No	126 (72.0)	49 (28.0)	175 (100)
	Yes	38 (45.8)	45 (54.2)	83 (100)
	Total	164 (63.6)	94 (36.4)	258 (100)

Table 7. Age, degree of hearing loss (pure tone average [PTA] for thresholds at .5, 1, and 2 kHz), and duration of tinnitus in years for patients who reported either that their tinnitus was worse in noise or quiet. Independent *t* tests were performed and did not show significant differences between the two groups for all factors.

Answer	Age (years)	Left PTA	Right PTA	Duration of tinnitus (years)
Worse in noise				
<i>M</i>	54.8	23.2	24.9	7.8
<i>SEM</i>	1.58	2.39	3.04	1.43
<i>N</i>	50	49	50	50
Worse in quiet				
<i>M</i>	54.4	21.6	21.2	11.5
<i>SEM</i>	1.01	1.26	1.34	1.49
<i>N</i>	75	75	75	75

Note. *SEM* = standard error of the mean.

basis of age, hearing loss, or duration of tinnitus. Further studies are warranted.

Implications for Treatment

Sound therapy can involve the use of noise, music, or other sounds to totally or partially mask tinnitus. Sound therapy is an integral part of the treatment of tinnitus for many patients (see Folmer & Carroll, 2006; Kemp & George, 1992; Searchfield, 2006). Both total and partial masking of tinnitus with noise has been promoted for decades (e.g., Coles & Hallam, 1987; Hazell, 1987; Jastreboff & Hazell, 2004; see Tyler, 2006a, 2006b, for a historical review; Tyler & Babin, 1986; Tyler & Bentler, 1987). Those patients who report tinnitus is better in noise would likely be good candidates for tinnitus maskers. Those patients who report tinnitus is worsened by noise might not be good candidates for maskers or should begin masker therapy with low levels of partial masking. It should not be expected that all patients with tinnitus will benefit from masking strategies. For future studies exploring the benefits of sound therapy, it could be useful to define treatment groups on the basis of whether their tinnitus is made better or worse by background noise.

Some protocols routinely suggest that patients with tinnitus avoid quiet (e.g., Jastreboff & Hazell, 2004). Patients whose tinnitus is worse in quiet can be counseled to avoid quiet, as suggested by Stouffer and Tyler (1990). However, those patients whose tinnitus is better in quiet

should not be encouraged to seek background noise. Instead, they might even be counseled to find or create quiet situations throughout the day as relief for their tinnitus.

It is noteworthy that some patients report that when they remove themselves from background noise, their tinnitus is worse. For these individuals (we have observed in our tinnitus clinic some factory workers, musicians, and some attending musical events), the harmful effects of the noise on their tinnitus are not apparent until after the noise exposure is over.

It might not be surprising that many patients report that their tinnitus was made worse by stress. It can be helpful to share with patients, that for most of us, our problems seem more difficult when we have other stressors in our lives. Furthermore, relaxation makes some patients' tinnitus better. Reducing the effects of tinnitus can sometimes be facilitated, not just by focusing on the tinnitus, but by exploring other sources of stress in our patients' lives and discussing those areas (Mohr & Hedelund, 2006). Patients experiencing severe anxiety or depression should be referred to psychologists (e.g., Andersson, Kyrre Svalastog, Kaldø, & Sarkohi, 2007; Noble & Tyler, 2007).

Many patients report their tinnitus is worse with lack of sleep. Of course many patients report that it is difficult to sleep because of their tinnitus. This could create a vicious cycle for these particular patients. Some patients responded that their tinnitus is better after an adequate amount of sleep. This highlights the importance sleep counseling (e.g.,

Table 8. Age, degree of hearing loss (pure tone average [PTA] for thresholds at .5, 1, and 2 kHz), and duration of tinnitus in years for patients who reported either that their tinnitus was better in noise or quiet. Independent *t* tests were performed and did not show significant differences between the two groups for all factors except for duration of tinnitus, *t* (56) = 2.13, *p* < .05.

Answer	Age (years)	Left PTA	Right PTA	Duration of tinnitus (years)
Better in noise				
<i>M</i>	53.8	22.1	22.3	11.5
<i>SEM</i>	1.38	1.50	1.76	2.13
<i>N</i>	45	45	45	45
Better in quiet				
<i>M</i>	57.2	20.6	27.9	2.9
<i>SEM</i>	3.82	5.13	8.99	.92
<i>N</i>	13	12	13	13

McKenna & Daniel, 2006). It is also interesting that many report that when first waking up in the morning, their tinnitus is better. This might be a result of a good nights' rest. However, it might also be that the brain has gone through many physiological/electrical changes throughout the sleep period, and this has had an impact on the brain's coding of the tinnitus. It is similarly intriguing the other patients report that, upon awakening, their tinnitus is worse. This is further evidence of subgroups.

The Establishment of Patients With Tinnitus Subgroups on the Basis of Patients' Reactions

It is likely that different subgroups of patients with tinnitus exist. For example, some subgroups might be demarcated by the following:

- Patients who reported their tinnitus was worse in noise or better in noise.
- Patients who reported their tinnitus was worse in quiet or better in quiet.
- Patients who reported their tinnitus is worsened by emotional or mental stress.
- Patients who reported their tinnitus is worsened with lack of sleep.
- Patients who reported their tinnitus is better with relaxation.
- Patients who reported their tinnitus is worse upon waking in the morning.
- Patients who reported nothing makes their tinnitus worse.

Studies that include and differentiate both measurements of tinnitus magnitude and reactions to tinnitus should help in this matter (Tyler, Oleson, Noble, Coelho, & Ji, 2007).

Summary

Patients often believe their perception or reactions to their tinnitus is often influenced by different external and internal events. We might expect that for some patients, stress or lack of sleep makes their tinnitus worse. However, it is not so apparent why some report that background noise makes their tinnitus worse, whereas others report that background noise makes their tinnitus better. We believe these individual differences should be considered in counseling and sound therapy and might also provide important insights into subgrouping patients. Things that made tinnitus worse included being in a quiet place (48%), stress (36%), having just been in a noisy place (36%), being in a noisy place (32%), and lack of sleep (27%). Things that made tinnitus better included noise (31%) and relaxation (15%). Almost 6% suggested coffee or tea made their tinnitus worse, and 4% said some foods made their tinnitus worse.

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